

REMARKS

Status of the claims

Claims 18, 20, 25, and 26 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by, or in the alternative under 35 U.S.C. § 103(a) as allegedly being obvious over, Lai et al. (U.S. Patent No. 5,871,650) (hereinafter “Lai”). In addition, claims 18, 20, 25, and 26 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by, or in the alternative under 35 U.S.C. § 103(a) as allegedly being obvious over, Matsukata (U.S. Patent Application Publication No. 2001/0012505).

Response to rejection under §§ 102/103 based on Lai

As noted, claims 18, 20, 25, and 26 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by, or in the alternative under 35 U.S.C. § 103(a) as allegedly being obvious over, Lai. Applicants respectfully traverse on the ground that Lai does not disclose or suggest the presently recited grain boundary layers.

Claim 18 presently recites a zeolite tubular separation membrane comprising a porous tubular support with both ends open and a zeolite membrane which is formed on a surface of the porous tubular support. Zeolite single crystals exposed on the surface of the zeolite membrane each have a growth axis almost perpendicular to the surface of the porous tubular support, and the membrane has grain boundary layers in spaces among the zeolite single crystals exposed on the surface of the zeolite membrane.

Contrary to the position set forth in the Office Action, Lai does not disclose or suggest the presently recited grain boundary layers. The position set forth in the Office Action is that the

interstitial spaces described in column 4, line 55 of Lai correspond to the presently recited grain boundary layers. However, this is incorrect. The interstitial spaces described in Lai at column 4, line 55 are not spaces among zeolite single crystals, but rather are part of the mesoporous growth enhancing layer (the “GEL” layer). The GEL layer in Lai is a distinct surface from the zeolite crystal surface. Thus, the interstitial spaces disclosed in this passage of Lai do not correspond to the presently recited grain boundary layers, which are “among the zeolite crystals exposed on the surface of the zeolite membrane.”

Applicants respectfully request that the reasons be clearly provided for why “the interstitial spaces” of the layer (GEL layer) located under the zeolite crystals in Lai are considered as an equivalent of the “grain boundary layers among the zeolite crystals exposed on the surface of zeolite membrane.”

Applicants also respectfully submit that there are other aspects of the presently recited grain boundary layer that Lai does not disclose or suggest. Applicants have described in the present specification at Paragraph No. [0075]:

The grain boundary layers 82 thus formed are made of oxides having a density larger than that of the zeolite crystals 81... Preferably, the pores larger in diameter than zeolite pores are not formed in the grain boundary layers 82. When pores with a large diameter are formed in the grain boundary layers 82, a good molecular sieve cannot be obtained. A zeolite membrane 8 including substantially dense grain boundary layers 82 exhibits a good molecular sieve effect.

Accordingly, the presently recited grain boundary layers are made of oxides having a density greater than that of the zeolite crystals and the pores in the grain boundary layer are no larger in diameter than the zeolite pores. Neither of these properties of the presently recited grain boundary layer are disclosed or suggested by Lai.

Applicants therefore respectfully submit that Lai does not anticipate or render obvious the presently claimed invention, and respectfully request the reconsideration and withdrawal of this rejection.

Response to rejection under §§ 102/103 based on Matsukata

Claims 18, 20, 25, and 26 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by, or in the alternative under 35 U.S.C. § 103(a) as allegedly being obvious over, Matsukata. Applicants respectfully traverse on the grounds that there is no description or suggestion within Matsukata that the presently claimed grain boundaries are inherent properties, and since there is also no reason set forth in the Office Action supporting this position, this rejection is improper.

The position set forth in the Office Action is that the presently recited grain boundaries are inherent properties of the structure disclosed in Matsukata. There is no discussion of why the Examiner believes that the grain boundaries are inherent or any reference to any teachings in Matsukata regarding why the grain boundaries would be inherent properties. MPEP § 2112(IV) clearly states that it is not enough that a certain characteristic (e.g. the presently recited grain boundaries) *may* occur in a given place. Instead, “[t]o establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.’” *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted); MPEP § 2112(IV).

Here, the Office Action has provided no rationale for why the presently recited grain boundaries would be inherently present in the structure in Matsukata. To that end, Applicants also note that the membranes in Matsukata do not correspond to the membranes of the presently claimed invention. Matsukata does not have any disclosure or teaching regarding the grain boundary layers, and in fact, the zeolite membrane of Matsukata has substantially no space between adjacent zeolite crystals. As previously suggested to the Examiner, the presently recited grain boundaries provide for a larger amount of flux in the presently recited membrane. As a result, the membrane of the presently claimed invention has superior performance to the membrane disclosed in Matsukata, which has substantially no spacing between zeolite crystals. Because the membrane of the presently claimed invention is structurally distinct from the membrane of Matsukata (in part due to the proximity of the zeolite crystals to each other in Matsukata), Applicants submit that the presently recited grain boundaries are not inherently present in Matsukata.

If the Examiner maintains this rejection, Applicants respectfully request that objective reasons be provided for why the grain boundaries are considered inherently present in Matsukata.

In the absence of such rationale, Applicants respectfully submit that the Office Action's position of inherency with respect to the presently claimed grain boundaries is improper, and respectfully request the reconsideration and withdrawal of this rejection.

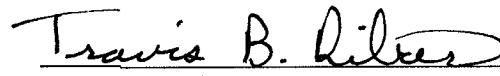
Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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